AN OVERVIEW OF OVERFISHING DEFINITIONS AND REBUILDING PLANS AS REQUIRED BY THE MAGNUSON-STEVENS ACT

Mark R. Millikin
Office of Sustainable Fisheries
National Marine Fisheries Service

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Our office was asked to present an overview of the requirements of the Magnuson-Stevens Fishery Conservation and Management Act for overfishing definitions and rebuilding plans for this 2-day workshop for "NMFS' Candidate Species Listing" under the Endangered Species Act.

The M-S Act was revised by the Sustainable Fisheries Act in October 1996. As a result, **[section 301(a) of]** the Magnuson-Stevens Act now contains 10 national standards instead of seven, for which all FMPs and their amendments must comply.

Also, NMFS on behalf of the Secretary of Commerce, reports annually to Congress and the fishery management councils on the status of fisheries within each Council's geographical area of authority and identifies those fisheries that are overfished or are ***approaching*** being overfished meaning the fishery will become overfished within two years. **[This fulfills requirements of section 304(e)(1) of the M-S Act].**

NMFS conducts stock assessments on a fairly regular basis for the most economically important marine fisheries in the U.S., and other stocks or stock complexes of special concern, as budgets permit. If a stock assessment indicates that a given fishery is overfished or approaching overfishing for the first time in the Annual Report or at some other time during the year, then NMFS notifies the appropriate fishery management council that a given stock is overfished, and that management measures need to be adopted and implemented within a year of notification. Such an action should contain measures that end overfishing and rebuild overfished stocks. The letter that NMFS sends to the Council is also published as a notice in the Federal Register. **[Notification of the Council and publication of a notice in the Federal Register fulfill requirements of section 304(e)(2) of the M-S Act}.**

As required by the M-S Act, **[Under section 304(e)(3)and(4) of the M-S Act,]** a Council shall prepare an FMP or FMP amendment with measures designed to end overfishing and rebuild the stock. For any overfished stock, the Council needs to specify a time period for ending overfishing and rebuilding the fishery. Such time periods should be as short as possible, taking into account the status and biology of the overfished stock, the needs of fishing communities, and interactions of the overfished stock within its marine ecosystem. The ***period for rebuilding*** should not exceed ***ten years***, except in cases where the biology of the stock of fish, or other environmental conditions or management measures from an international agreement dictate otherwise.

NMFS issued a final rule in the Federal Register on May 1, 1998, that revised guidelines for national standards 1, 2, 4, 5, and 7 of the M-S Act.

The revisions to the guidelines for national standard one are especially important because they effect overfishing definitions and rebuilding plans.

Definitions of terms related to National Standard 1 (see overhead)

Standard 1 – states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield (OY) from each fishery for the U.S. fishing industry. OY and the conservation and management measures proposed to achieve it must prevent overfishing. Each FMP should include an estimate of maximum sustainable yield (MSY).

"OY" means the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities and taking into account protection of marine ecosystems. OY is based on MSY as it may be ***reduced*** to take into consideration relevant social, economic, and ecological factors.

"MSY" is the **long-term average catch or yield** that can be taken from the stock or stock complex under prevailing ecological conditions.

"MSY control rule" means a **harvest strategy** which, if implemented, would be expected to result in a long-term average catch approximating MSY.

"MSY stock size" means the **long-term average size of stock** or stock complex ($B_{msy} = B_{target}$), measured in terms of spawning biomass or other appropriate units, that would be achieved under an MSY control rule in which fishing mortality is constant.

"Overfishing" occurs whenever a stock or stock complex is subjected to a rate or level of fishing mortality ($F_{threshold}$)that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.

"Overfished" occurs when a stock or stock complex is sufficiently small in biomass (less than $B_{threshold}$) that a change in management practices is required in order to achieve an appropriate level and rate of rebuilding.

Alternatives in specifying MSY

When data are not sufficient to estimate MSY directly, Councils should adopt other measures of productive capacity that can serve as reasonable proxies for MSY. If a reliable estimate of pristine stock size (average stock size in the absence of fishing) is available, then a stock size approximately 40 percent of this value may be a reasonable proxy for MSY stock size. Proxies for F_{msy} include natural mortality rate (M), $F_{0.1}$, and F_{max}.

Status determination criteria for overfishing definitions (see overhead)

Each FMP must specify objective and measurable status determination criteria for each stock or stock complex covered in the FMP. Analysis should show how such criteria were chosen and how they relate to reproductive potential. These criteria must be expressed so that the Council and the Secretary can monitor the stock annually to determine whether overfishing is occurring or the stock is overfished. NMFS guidelines recommend that status criteria of overfishing definitions include two values for fishing mortality and biomass. Target fishing mortality rate (F_{target}) is the F value that is likely to maintain a stock biomass of B_{msy}. Maximum fishing mortality rate ($F_{threshold}$) is the F value beyond which overfishing is occurring and varies with biomass. Two biomass values should also be designated for each stock, those being the **target biomass** which is B_{msy} or its proxy, and the **threshold biomass**. Any biomass amount below $B_{threshold}$ indicates that the stock is overfished. For a given fish stock, $F_{threshold}$ is usually > F_{target} and B_{target} > $B_{threshold}$ for a given stock. By setting the two different values for F and biomass, a control rule can also be established for the overfishing definition. Again, proxy values can be used if necessary. **[Overhead – See Table from 33rd SAW]**

Example of overfishing definition-Sea scallop fishery (see overhead)

In the sea scallop fishery, since good estimates of MSY are not available, proxy values related to kg of scallops age 3 or older per standardized tow from the NMFS sea scallop survey **[how many years has NMFS sampled for sea scallops in this manner?]** are used as a measure to estimate biomass. For Georges Bank and the Mid-Atlantic, the stocks are considered rebuilt to MSY stock size once the kg/tow values for age 3 and older scallops are greater than or equal to 8.16, and 3.9, respectively. For Georges Bank, the stock is **overfished** when the survey yields an average kg/tow value of ***less than*** 1/4 of 8.16, and for the Mid-Atlantic, stock is **overfished** once the value is ***less than*** 1/4 of 3.9. The proxy for F_{msy} was set at $F_{max.}$ For both scallop stocks, **overfishing** occurs when F ***exceeds*** F_{max} which is 0.24, when the stock is equal to or greater than B_{msy}. Overfishing is also occurring when F>zero when stock biomass is below $1/4B_{msy}$.

The sea scallop control rule is set up as follows: When the NMFS survey stock biomass for age 3 and older scallops is between B_{max} and $0.5B_{max}$, F will be set to allow the stock to rebuild to B_{max} in a period no longer than 10 years (see overhead). When the survey biomass is between $0.5B_{max}$ and $B_{threshold}$ ($0.25B_{max}$), F will be set to allow the stock to rebuild in five years. When survey biomass

reaches $0.25B_{max}$ or lower, then F should be as close to zero as possible.

The current overfishing definitions for sea scallops were implemented in February 1999 by the final rule for Amendment 7. Large closure areas off New England were implemented in 1994 to protect groundfish. The areas prohibited harvest of any gear capable of taking groundfish (especially trawl and dredges) so that sea scallops also were protected. The areas were reopened on a limited basis to scallop fishing in 1999 and 2000. Two Mid-Atlantic closure areas designed to protect scallops were implemented in March 1998 and were reopened to scallop fishing on a limited basis in 2001. The large size of these closure areas and the fact that scallops mature early (in their third or fourth year) are chief reasons that both stocks of scallops have rebuilt so rapidly **[Overhead – see map of scallop closures]**.

The biomass amounts for both the Georges Bank and the Mid-Atlantic stocks (open plus closed areas combined for each management area) reached the B_{msy} proxy of B_{max} in 2000 with values of about 9.0 and 4.0 kg for age 3 and older scallops/tow, respectively. Therefore, neither stock is overfished. Overfishing was still occurring in the Mid-Atlantic stock recently, so F needs to be reduced for this stock.

The target fishing mortality for the Scallop FMP = 80 percent of F_{max}. This is prudent because as Mace (2001) reported: "Experience suggests that there is far greater chance of overshooting a fishing target than there is of falling short of it," and "Fishing somewhat below F_{msy} generally results in a relatively small loss in average catch for a relatively large gain in average stock biomass."

<u>Candidate species under the Endangered Species Act</u>

Once a species is selected for inclusion on the Candidate Species List under the ESA, one option for managers would be to establish reference points such as threshold and target biomass for ***threatened*** and ***endangered*** in a similar fashion to the methods used under the M-S Act. For the sake of discussion, a *threatened* threshold biomass might correspond to a value of $0.1B_{msy}$ or its proxy for jewfish or Nassau grouper and *endangered* might correspond to $0.05B_{msy}$ for some species. Control rules could be developed that would include: (1) a target biomass for which threatened or endangered status, as the case may be, is not imminent, and (2) a threshold biomass beyond which any lower biomass value would indicate that a threatened or endangered status occurs, as the case may be. Therefore, the principles behind reference points and status determination criteria for

overfishing definitions under the M-S Act, might serve in some form as the basis for management of various species under the ESA.

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